

**ABSTRACT**

[0040] Coplanar waveguides having a deep trench between a signal line and a ground plane and methods of their fabrication are disclosed. An oxide layer is provided over a silicon substrate and a photoresist is applied and patterned to define areas where the signal line and the ground plane will be formed. A barrier layer is provided over the oxide layer in the defined areas. A metal layer is then deposited over the barrier layer. An etch mask is deposited over the metal layer for the subsequent trench formation. The photoresist and the underlying portion of the oxide and barrier layers are removed and a deep trench is formed in the substrate between the signal line and the ground plane using etching through the mask.